**Homework H.4.S**

Given: Particle B having a mass of m is rigidly attached to arm OB, where OB has negligible mass and a length of L. OB is pinned to ground at end O and is able to rotate about O without any frictional resistance. A second particle A (also having a mass of m) is able to slide along arm OB. When OB is rotating with an rotational speed of $\omega = \omega_1$, particle A is released from rest with respect to OB at the midpoint of the arm. Particle A slides outward on arm OB, eventually impacting particle B. The coefficient of restitution for the impact of A with B is e.

Find: Determine the velocity of A immediately after its impact with B. Write your answer as a vector in terms of its $\hat{e}_R$ and $\hat{e}_\phi$ components.
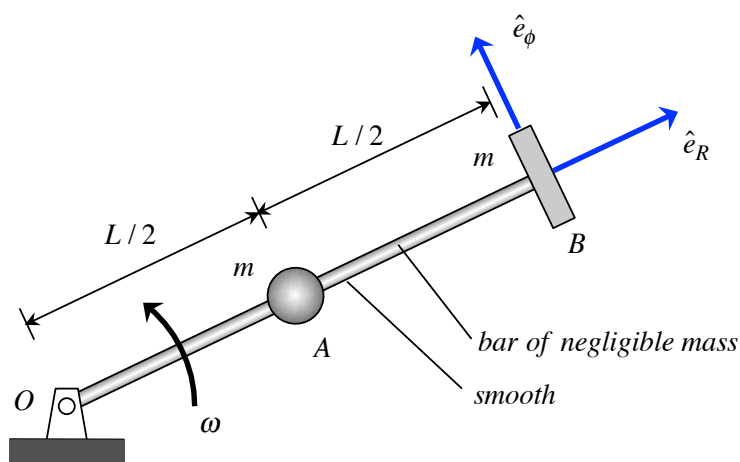
HORIZONTAL plane

Please leave your final answer in terms of, at most, m, L, ω_1 and e.